

Software Process Improvement

Peter Dolog
dolog [at] cs [dot] aau [dot] dk
5.2.47
Information Systems
April 7, 2008

Goals

To understand SPI

To perform tutorial on CM and Soft. Proc. Modeling (D405a,
D406a)

To understand alternative Approach to SPI through Recepies

Motivation

Software Engineering is a continued struggle to improve quality and fight schedule and cost overruns

Piles of literature have emerged over the last 15 years on how to improve software processes (SPI)

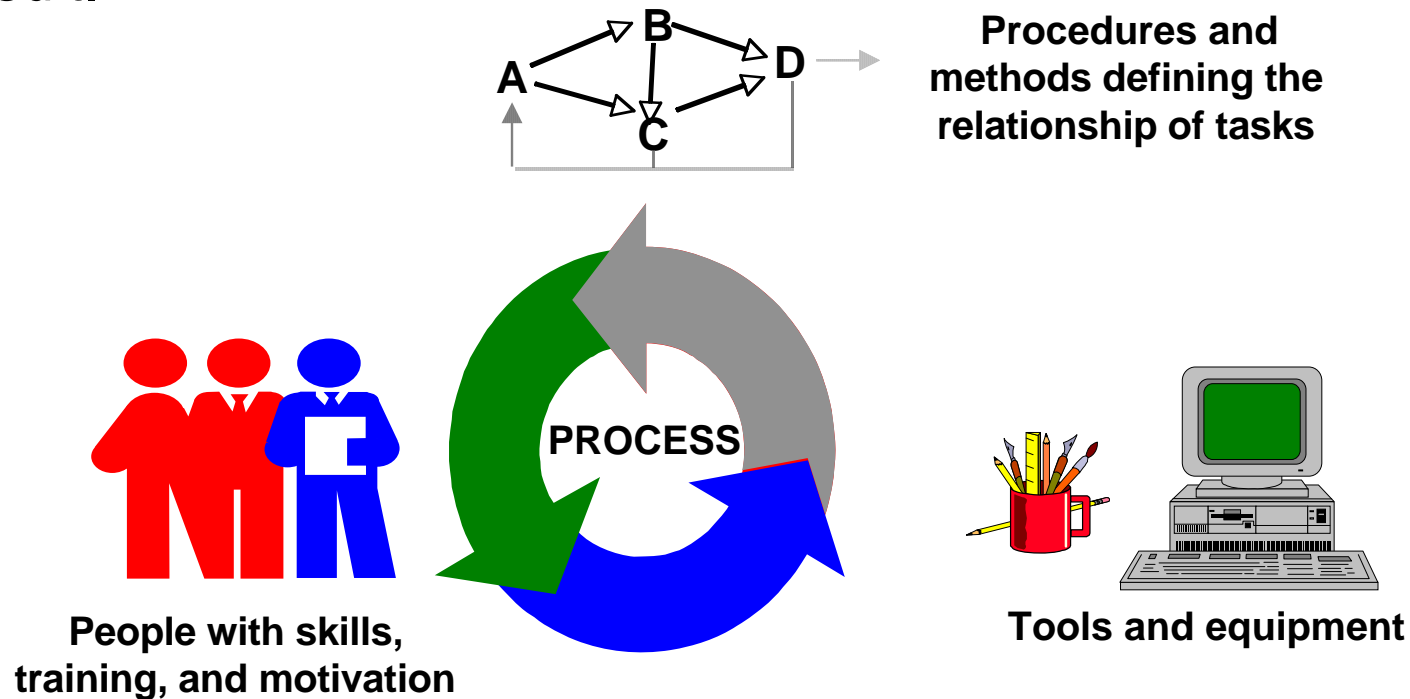
Many practical improvement efforts seem to fail

The challenges of SPI seem poorly understood

Agile approaches seem to offer alternative strategies for SPI but cannot be understood from within the existing SPI framework

A Definition of Process

The means by which people, procedures, methods, equipment, and tools are integrated to produce a desired end result.



A Defined Process Can:

Help guide the work in an orderly way

Improve the understanding of what should be done

Provide organizations with a consistent working framework
while permitting individual adjustments to particular
needs

The Benefits of Process Standards

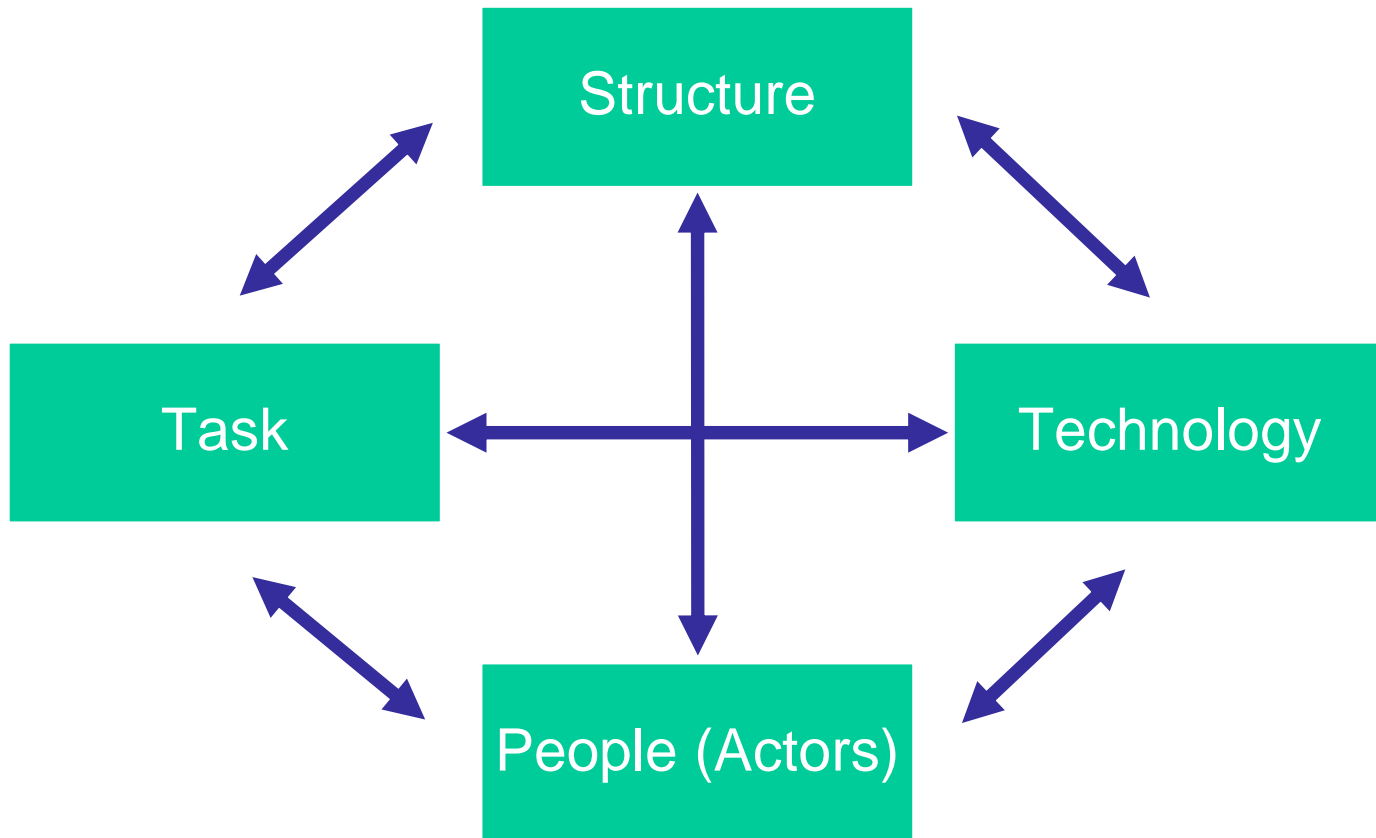
Help reduce the problems of training, review, and tool support.

With standard methods, each project's experiences can contribute to overall process improvement.

Process standards provide the basis for process and quality measurements.

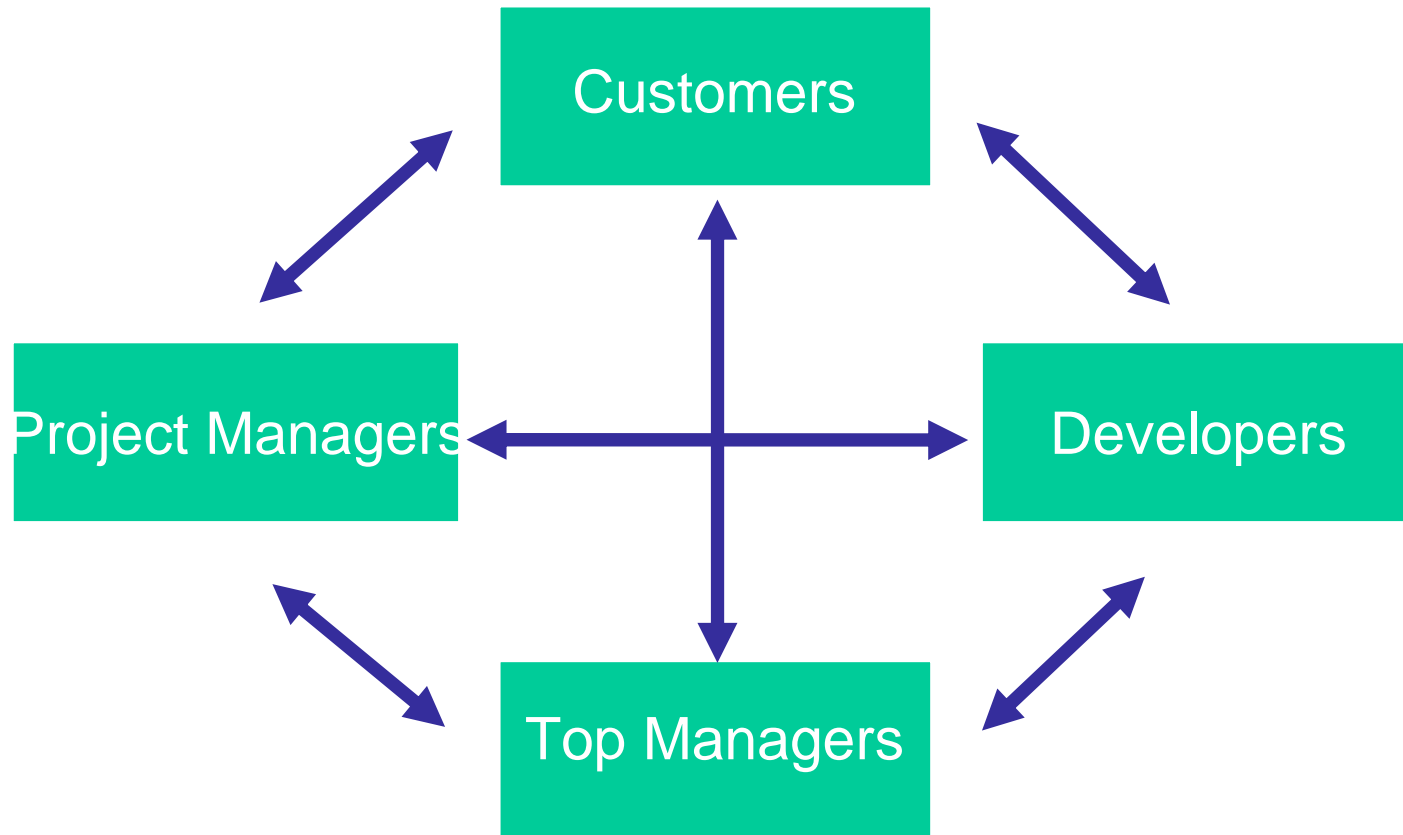
Since process definitions take time and effort to produce, it is impractical to produce new ones for each project.

Organizational System



Leavitt, H. J. (1965) "Applied Organizational Change in Industry: Structural, Technological and Humanistic Approaches." In James G. March, Ed., Handbook of Organizations, 1144-1170. Chicago: Rand McNally.

SPI - Complex Interactions



SPI processes: IDEAL

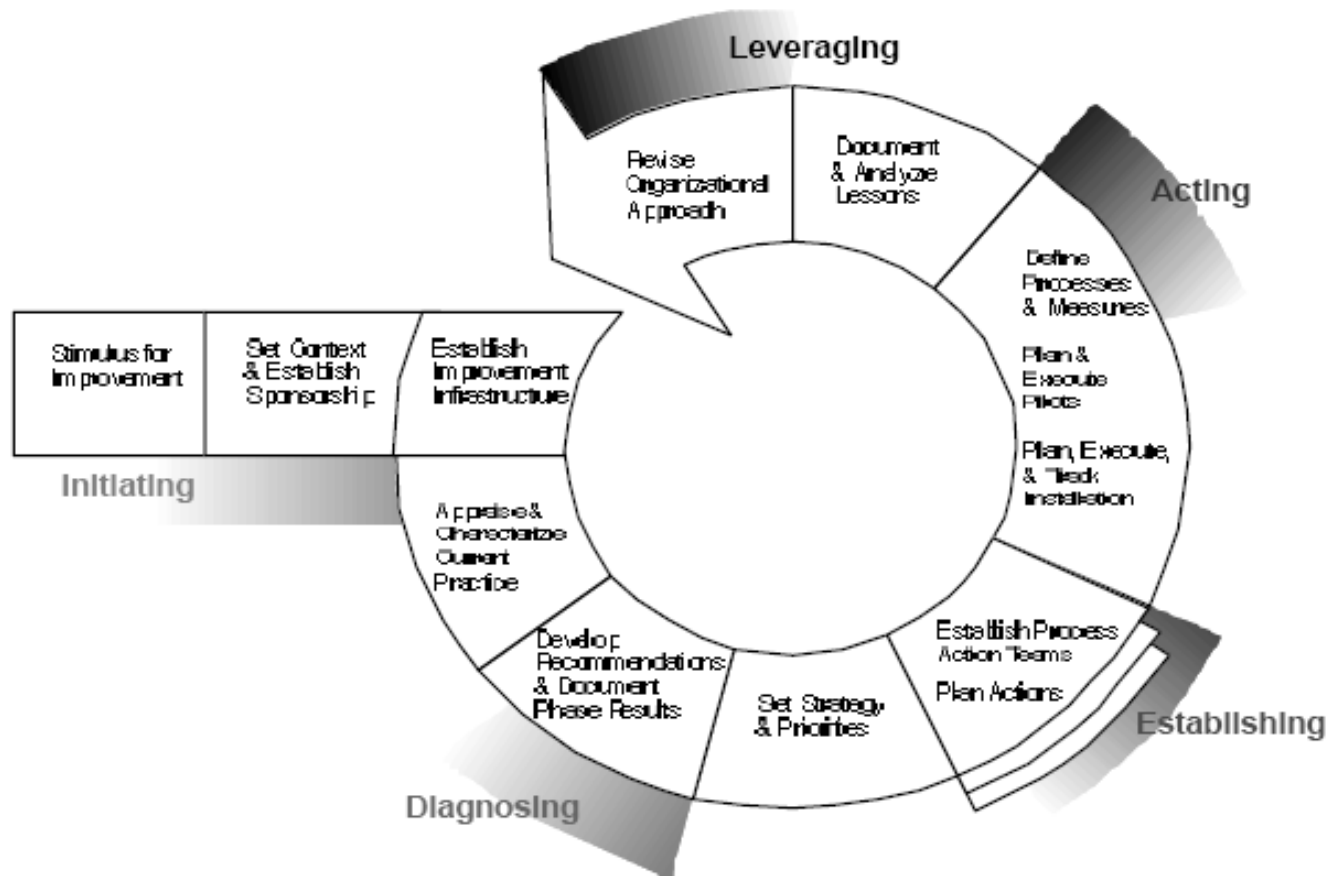


Figure Intro-1: The IDEAL Model

© Robert McFeeley: **IDEAL: A User's Guide for Software Process Improvement**. SEI

Software Process Measurement

Process-related measures

Project-related measures

Product-related and customer-related measures

Zahran, S. (1998). Software Process Improvement: Practical Guidelines for Business Success. Reading, Mass., Addison-Wesley.

Process-related measures

Number of times the program failed to rebuild overnight

Number of defects introduced per developer hour

Number of changes to requirements

Hours of programmer time available and spent per week

Number of patch releases required after first product ship

Overhead of each inspection

Cost of first-time testing

Cost to fix code defects

Cost to fix design defects

Project-related measures

Productivity

Staff hours

Dates

Overrun for schedules

Progress vs. Plan

Number of units completed

Number of units tested

Problem Counts

Product/customer-related measures

Cyclomatic Complexity

Lines of Code

Comments Percentage

Cyclomatic complexity Method

Weighted methods per class

Response for a class

Lack of cohesion of methods

Coupling between objects

Depth of inheritance tree

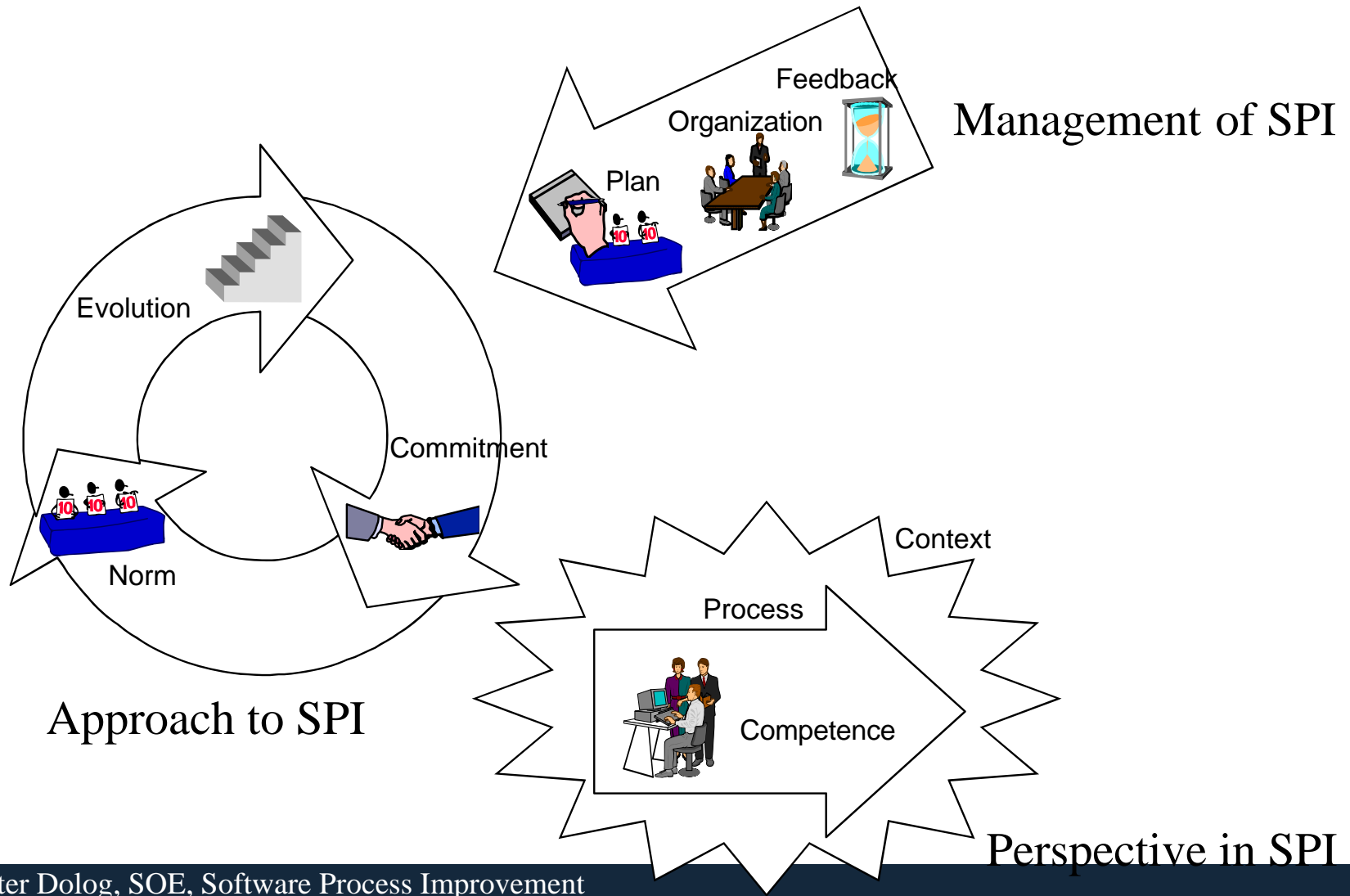
Number of children

Number of change requests

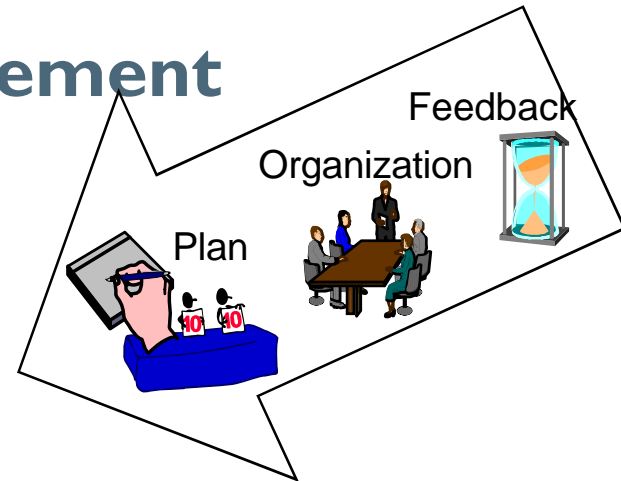
A MAP of SPI

| 1998-2001 |

MAP of Software Process Improvement

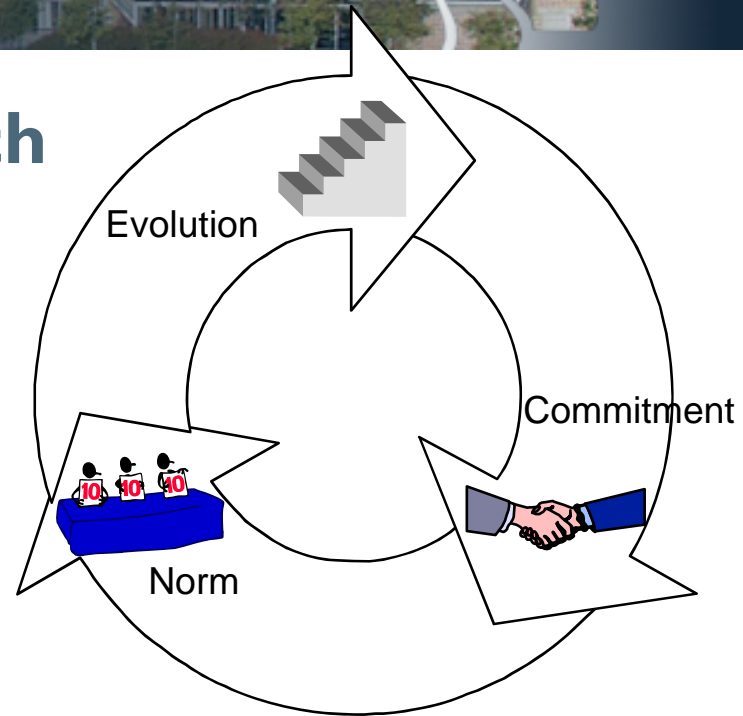


Key elements in SPI management



Concern	Idea	Aspiration	Pitfalls
Management of SPI	Organization	Dedicated and adapted effort	Inadequate resources, emphasis and coordination
	Plan	Plan goals, activities, responsibilities and coordination	Inability to improve. Diversity or deadlock
	Feedback	Measure and assess benefits	Opportunism, and loss of relevance

Key ideas in SPI approach



Concern	Idea	Aspiration	Pitfalls
Approach to SPI	Evolution	Experimental learning and stepwise improvement	Wearing and inertia
	Norm	Seek guidance in ideal processes	Hastiness and fundamentalism
	Commitment	Ensure dedication and legitimacy	Politics and gold plating

The general MAP

Concern	Idea	Aspiration	Pitfalls
Management of SPI	Organization	Dedicated and adapted effort	Inadequate resources, emphasis and coordination
	Plan	Plan goals, activities, responsibilities and coordination	Inability to improve. Diversity or deadlock
	Feedback	Measure and assess benefits	Opportunism, and loss of relevance
Approach to SPI	Evolution	Experimental learning and stepwise improvement	Wearing and inertia
	Norm	Seek guidance in ideal processes	Hastiness and fundamentalism
	Commitment	Ensure dedication and legitimacy	Politics and gold plating
Perspective in SPI	Process	Integrate people, management and technology	Disinterested customers
	Competence	Empowerment through competence building	Turf guarding
	Context	Establish sustainable effort	Machine bureaucracy